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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,403	01/09/2004	Dong-ryeol Park	033808-010	6389

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EXAMINER	
BROADHEAD, BRIAN J	
ART UNIT	PAPER NUMBER
3661	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/753,403	PARK ET AL.	
	Examiner	Art Unit	
	Brian J. Broadhead	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6-16-04, 1-18-05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4, 12, and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 1 recites the limitation "the modules" in line 17. There is insufficient antecedent basis for this limitation in the claim.

4. Claim 3 recites the limitation "the specified position calculation algorithm" in line 27. There is insufficient antecedent basis for this limitation in the claim.

5. Regarding claims 12 and 13, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1 through 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goncalves et al. US 2004/0167670, in view of Rocks, 5974348.

8. Goncalves et al. disclose an image processing module (602) for calculating image coordinates at least one of the plurality of the light sources by detecting the light sources, controlled to flicker in response to the light source control signal, from an image signal obtained by a camera(this would be included in with the landmarks), a pose calculation module for calculating coordinates of the mobile robot using the calculated image coordinates and previously stored world coordinates of the light sources a motion control module for calculating a moving path for the mobile robot by applying the position coordinates of the mobile robot to previously stored spatial coordinates of the working space and controlling the mobile robot to move along the moving path; and a main control module for controlling interoperations of the modules and general operations of the mobile robot; further comprising a memory module for storing the world coordinates of the light sources, spatial coordinates of the mobile robot in the working space, and parameters calculated through camera calibration for compensating for distortion of a lens of the camera, wherein the pose calculation module calculates translation and rotation of the robot by applying the image coordinates and the world coordinates to the specified position calculation algorithm, the pose calculation algorithm is a certain transformation matrix equation that is obtained by constructing an extension model for obtaining a translation and a rotation of the camera using a world coordinate system and a camera coordinate system and applying the extension model to a formula for compensating for distortion caused by a lens of the camera. the pose calculation module calculates translation and rotation of the robot by applying image coordinates and world coordinates to a certain pose calculation

algorithm, an image processing module for detecting feature points of the light source, controlled to flicker through the communications module, from an image signal obtained by a camera; a motion control module for controlling the mobile robot to move under control of the main control module; and a memory module for storing parameters calculated through camera calibration for compensating for distortion caused by a lens of the camera, world coordinates of the light sources, and spatial coordinates of the mobile robot in a working space. wherein the pose calculation algorithm is a certain transformation matrix equation that is obtained by constructing an extension model for obtaining a translation and a rotation of the camera using a world coordinate system and a image coordinate system, and applying the extension model to a formula for compensating for distortion caused by a lens of the camera, and the camera detects the wavelength of the light source in paragraphs 75, 14, 160, 84, 51-56.

9. Goncalves et al. do not disclose a communications module for transmitting a light source control signal to selectively control flickering of a plurality of light sources of a landmark array provided in a working space; a landmark array comprising a plurality of light sources disposed in a certain area to selectively flicker; a landmark array control module for controlling the light sources of the landmark array to flicker; and an access point for receiving and processing the light source control signal transmitted from the mobile robot; and a light source control unit for controlling corresponding light sources to flicker in response to the light source control signal input from the access point; the communication is through infrared. Rocks teaches a communications module for transmitting a light source control signal to selectively control flickering of a plurality of

light sources of a landmark array provided in a working space; a landmark array comprising a plurality of light sources disposed in a certain area to selectively flicker; a landmark array control module for controlling the light sources of the landmark array to flicker; and an access point for receiving and processing the light source control signal transmitted from the mobile robot; and a light source control unit for controlling corresponding light sources to flicker in response to the light source control signal input from the access point on lines 50-67, on column 9, lines 1-20, on column 10, and lines 38-67, on column 13. It would have been obvious to one of ordinary skill in art at the time the invention was made to use the beacons of Rocks in the invention of Goncalves et al. because such modification would provide precise navigation with respect to six degrees of freedom as disclosed by Rocks. The beacons of Rock provide easily identifiable landmarks in different planes that can be used by the invention of Goncalves et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Broadhead whose telephone number is 571-272-6957. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BJB

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